

medical image may be of any suitable dimensionality, such as, e.g., 2D (e.g., a 2D slice of an MRI image), 2.5D, or 3D.

[0020] Furthermore, the case datasets may include additional patient data, such as patient age, patient size PSA values, other data, in particular, from an electronic health report (EHR).

[0021] The general term “case datasets” includes the current case dataset, i.e. the current medical dataset or the current case medical dataset, as well as the pre-stored medical datasets. “A number of” means at least one, but preferably several or “a multitude of.” The current case dataset is the input dataset, which is to be assessed by an observer. The current case dataset can be directly obtained from an imaging modality used to acquire the medical image or retrieved from a data storage, e.g. a local data memory or network data storage such as the PACS (Picture Archiving and Communication System) or a remote computer.

[0022] The pre-stored medical datasets stem from different cases, i.e. different patients, other than the current case. They are, for example, provided by local data storage or by a network data storage such as a cloud data storage. Thus, the pre-stored medical datasets are retrievable stock case datasets.

[0023] All of the datasets are evaluated and, in particular, quantified in definitive features by the same AI-based method, which renders the analyzed features directly comparable. Thus, the definitive features are defined evaluated features that are the output by the AI-based method. The quantification may also include a weighting of the definitive features in their mutual relation. In a simple embodiment, only one definitive feature is evaluated. Preferably, the definitive features and the number of definitive features are chosen in a way that allows the most distinctive comparison.

[0024] The term “AI-based method” means a machine method that mimics cognitive functions associated with the human mind. The term includes e.g. machine learning and deep machine learning.

[0025] Depending on the AI-based method, the features that are evaluated can be defined before or in the process of designing, i.e. training, the AI-based method. Therefore, the definitive features can be concrete or derived (especially with respect to mpMRI images). This means the features can have the form of human-recognizable features, such as e.g. size or shape of an abnormality; or result from more complex, human-unrecognizable connections that are implemented in the trained AI-based method. The evaluation of the definitive features is performed in particular with regard to the potential clinical significance of the data.

[0026] Due to the quantification of the obtained definitive features, it is possible to determine a distance between the features of the compared datasets and, thus, between the datasets as a whole. The distance is in an inverse relation to the similarity. It may be measured in any suitable distance measure, such as e.g. Euclidean distance.

[0027] “Identifying” means determining the most similar datasets. These can be selected and output, i.e. they are e.g. stored, transmitted or displayed. The number of the similar pre-stored medical datasets to be selected can be chosen by the observer. To facilitate the assessment of the datasets, i.e. particularly the radiological images, the identified similar pre-stored medical datasets are preferably displayed for the observer next to the current case dataset. This advantageously reduces the interobserver variability.

[0028] According to one embodiment, a dataset evaluation arrangement for identifying similar pre-stored medical datasets for comparison with a current case dataset includes

[0029] a first interface for receiving a current case dataset including radiological data of a patient;

[0030] a second interface to a number of pre-stored medical datasets each including radiological data of other patients;

[0031] an evaluation processor for evaluating each case datasets according to a predefined AI-based method to obtain a number of definitive features for that case dataset;

[0032] a comparator for comparing the definitive features of the current case dataset with the definitive features of each pre-stored medical dataset to identify a number of pre-stored medical datasets most similar to the current case dataset); and

[0033] an output interface for outputting the identified number of most similar pre-stored medical datasets.

[0034] Thus, the dataset evaluation arrangement includes all means and is configured to realize the method for identifying similar pre-stored medical datasets. The first interface, the second interface and the output interface may be configured as separate interfaces or one or more of them may be configured as one integrated interface.

[0035] According to one embodiment, a medical display arrangement includes an arrangement for identifying similar pre-stored medical datasets and a display for displaying the identified datasets. The medical display arrangement or the arrangement for identifying similar pre-stored medical datasets does not diagnose, but provides the display for diagnosis by an observer.

[0036] According to one embodiment, a magnetic resonance imaging system includes an MRI device and a medical display arrangement or an arrangement for identifying similar pre-stored medical datasets.

[0037] Some units or modules of the dataset evaluation arrangement mentioned above can be completely or partially realized as software modules running on a processor of a computing system or a medical diagnostic arrangement. A realization largely in the form of software modules can have the advantage that applications already installed on an existing system can be updated, with relatively little effort, to install and run these units of the present application. The object is also achieved by a computer program product with a computer program that is directly loadable into the memory of a computing system or of a magnetic resonance imaging system, and which includes program units to perform the acts of the method when the program is executed by the medical diagnostic arrangement or the computing system. In addition to the computer program, such a computer program product can also include further parts such as documentation and/or additional components, also hardware components such as a hardware key (dongle etc.) to facilitate access to the software.

[0038] A non-transitory computer readable medium such as a memory stick, a hard-disk or other transportable or permanently-installed carrier can serve to transport and/or to store the executable parts of the computer program product so that these can be read by a processor of a medical diagnostic arrangement or a computing system. A processor can include one or more microprocessors or their equivalents.